

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- ① BLACK BORDERS *black line*
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

**FLOORING FOR BUILDING**

Patent Number: JP7310426  
Publication date: 1995-11-28  
Inventor(s): KONISHI TOSHIYUKI; others: 03  
Applicant(s):: DAIKEN TRADE & IND CO LTD  
Requested Patent: ☐ JP7310426  
Application Number: JP19940129655 19940518  
Priority Number(s):  
IPC Classification: E04F15/04  
EC Classification:  
Equivalents: JP2816424B2

---

**Abstract**

---

**PURPOSE:** To make the accurate execution of works achievable without entailing any dislocation and joint gap among flooring members.

**CONSTITUTION:** Flooring F is made up of stacking a wood flooring subject 1 on a flexible base material 2 with moderate elasticity into unification, and a female tongue 4 with a horizontal projecting part, whose lower half part is formed at an end of this flexible base material 2, is formed in the end face side on one side in both front and rear end faces being paralleled with each other in this flooring F. Likewise a male tongue 5 with an elastic layer formed by a part of the flexible base material 2 on an underside is formed at the end face side on the other and it is accustomedly deformed at a section consisting of a part of the flexible base material 2 where both these tongues 4 and 5 are made contact with each other, while the extent of their frictional resistance is increased, thereby preventing any dislocation and joint gap from occurring. In addition, both female and male engaging body parts 6 and 7 are formed on double side end faces in parallel with each other, and an upward opening's engaging groove part installed in the female engaging body part 6 and a downward engaging projection strip installed in the male engaging body part 7 both are formed with a part of the flexible base material 2 and workability is improved by the running-in deformation of both of them and simultaneously any joint gap is prevented from occurring by means of an engagement between the groove part and the projection strip.

---

Data supplied from the esp@cenet database - I2

(51) Int.Cl. <sup>6</sup>	識別記号	庁内整理番号	F I	技術表示箇所
E 0 4 F 15/04		F 7416-2E		
		B 7416-2E		

審査請求 未請求 請求項の数 3 F D (全 7 頁)

(21) 出願番号 特願平6-129655

(22) 出願日 平成6年(1994)5月18日

(71) 出願人 000204985

大建工業株式会社

富山県東砺波郡井波町井波1番地の1

(72) 発明者 小西 俊行

大阪市北区中之島2-3-18 大建工業株式会社内

(72) 発明者 林 晋司

大阪市北区中之島2-3-18 大建工業株式会社内

(72) 発明者 青木 英一

大阪市北区中之島2-3-18 大建工業株式会社内

(74) 代理人 弁理士 山本 孝

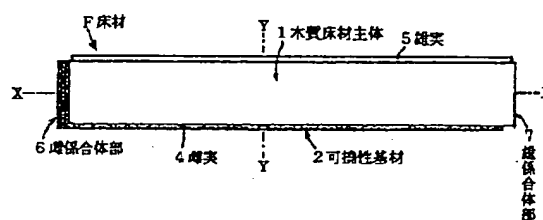
最終頁に続く

(54) 【発明の名称】 建築用床材

(57) 【要約】

【目的】 床材間にずれや目隙を生じさせることなく精度のよい施工が可能な直置床材を提供する。

【構成】 床材Fは適度な弾性を有する可撓性基材2上に木質床材主体1を積層一体化してなり、この床材Fの互いに平行な前後端面における一方の端面側に下半部が上記可撓性基材2の端部で形成された水平突状部4cを有する雄実4を形成し、他方の端面側に下面に可撓性基材2の一部によって形成された弾性層5dを有する雄実5を形成してこれらの雌雄実4、5の互いに接触する可撓性基材2の一部よりなる部分で馴染み変形させると共に摩擦抵抗を増大させてずれや目隙の発生を防止するようにし、さらに、互いに平行な両側端面に雌雄係合部6、7を形成し、雌係合部6に設けた上向き開口の係合溝部6dと雄係合部7に設けた下向き係合突条部7cとを上記可撓性基材2の一部で形成して両者の馴染み変形により施工性を向上させると共に該溝部6dと突条部7cとの係合によって目隙の発生を防止する。



## 【特許請求の範囲】

【請求項1】 前後端面と両側端面とがそれぞれ互いに平行な端面に形成された木質床材主体の下面に適度な弾性を有する可撓性基材を一体に貼着してなる床板において、前後端面と両側端面とのいずれか一方にはそれぞれ雌突と雄突が形成された雌雄突を有し、他方には、一端部側の上半部を断面し字状に切除することによって下半部に水平係合突片部を形成し且つ該突片部にその先端面と平行な係合溝部を刻設すると共に少なくともこの係合溝部の底面上上記可撓性基材が露出してなる雌係合体部と、他端部側の下半部を切除することによって上半部に上記一端側の水平係合突片部上に係合可能な形状に形成された上側水平係合突片部を設け且つ該水平係合突片部の下面に上記係合溝部に係合可能な形状を有すると共に少なくとも下端部が上記可撓性基材の一部によって形成された係合突条部を設けてなる雄係合体部がそれぞれ形成されて雌雄係合体部を有することを特徴とする建築用床材。

【請求項2】 上記雌雄係合体部において、雌係合体部の水平係合突片部の上方に、該水平係合突片部よりも突出長の短い上記木質床材主体の上端部よりなる上側突片部を設けてこれらの上下突片部間に水平嵌合溝を形成していると共に雄係合体部の水平係合突片部の先端上部を断面し字状に切欠いて上記上側突片部が嵌合可能な形状を有する嵌合段部と上記水平嵌合溝が挿嵌可能な形状を有する水平突条部とを形成してなることを特徴とする請求項1記載の建築用床材。

【請求項3】 上記雌雄係合体部において、雌係合体部は水平係合突片部の上面に係合溝部を設けて断面上向きし字状に形成していると共に、雄係合体部はその水平係合突片部の下面に前記係合溝部に嵌合可能な位置に係合突条部を残して断面下向きし字状に形成してなることを特徴とする請求項1記載の建築用床材。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は合板やパーティクルボードよりなる床下地、RC造りのコンクリート床下地、或いはOA床等のような平坦な床下地上に接着剤を用いることなく直置きしながら施工するのに適した建築用床材に関するものである。

## 【0002】

【従来の技術】 従来から、床下地上に床材を施工する場合、長方形のムク材や合板フローリング材の下面に不陸の吸収や接着性、防音性の向上を図る目的で繊維状やシート状のクッション材を貼着してなる床板を用い、この床板を床下地上に接着剤によって貼着する方法が広く採用されているが、接着剤の塗布作業等に煩雑さが生じるばかりでなく、床材を床下地上に一体に固着させると張り替えが困難になるという問題点がある。

【0003】 このため本願出願人等は、特願平5-15 50

2604号に記載しているような直置床材を開発した。この床材は、図9～図11に示すように、木質床材主体Aの下面に該木質床材主体Aよりもその比重と厚みとの積が大きい適度な弾性を有する可撓性基材Bを一体に貼着すると共に直角に隣接する一方の長短端辺部に雌突部Cを、他方の長短端辺部に雄突部Dを形成してなり、可撓性基材B内に床材の重心を位置させて床板全体が床下地面の形状に応じて馴染み変形させるようにし、床下地面の不陸を吸収すると共に床下地面からの浮き上がりや床鳴り現象をなくするようにしている。

## 【0004】

【発明が解決しようとする課題】 しかしながらこのような構造では、床下地面上に床材を敷設した場合、隣接する床材の雌雄突部C、Dが突き合わせ状態で互いに嵌合しているだけであるから、歩行時や地震発生等による水平方向の外力によって床下地面と床板との間で滑りが生じた場合や、吸放湿等によって床板自体が伸縮した場合には雌雄突部同士が互いに離間する方向に妄動して突き合わせ端面間に目隙が生じ、精度のよい床が得られないという問題点があった。

【0005】 このような目隙の発生は、床材同士の対向端面に互いに係止可能なフック等の規制部材を取り付ければ防止することができるが、そうすると、施工に際して規制部材同士の嵌合が円滑に行われなかったり、互いに係合した規制部材の上面間に段差が生じたり、規制部材同士の接触音が生じる上に、床材主体に対する規制部材の取付作業が煩わしくて床材の量産化に適さないという問題点がある。本発明はこのような問題点を全面的に解消し得る建築用床材の提供を目的とするものである。

## 【0006】

【課題を解決するための手段】 上記目的を達成するため本発明の建築用床材は、前後端面と両側端面とがそれぞれ互いに平行な端面に形成された木質床材主体の下面に適度な弾性を有する可撓性基材を一体に貼着してなる床板において、前後端面と両側端面とのいずれか一方にはそれぞれ雌突と雄突が形成された雌雄突を有し、他方には、一端部側の上半部を断面し字状に切除することによって下半部に水平係合突片部を形成し且つ該突片部にその先端面と平行な係合溝部を刻設すると共に少なくともこの係合溝部の底面上上記可撓性基材が露出してなる雌係合体部と、他端部側の下半部を切除することによって上半部に上記一端側の水平係合突片部上に係合可能な形状に形成された上側水平係合突片部を設け且つ該水平係合突片部の下面に上記係合溝部に係合可能な形状を有すると共に少なくとも下端部が上記可撓性基材の一部によって形成された係合突条部を設けてなる雄係合体部がそれぞれ形成されて雌雄係合体部を有する構造としている。

【0007】 また、請求項2に記載した発明は、上記雌雄係合体部において、雌係合体部の水平係合突片部の上

なく、両者の摩擦抵抗が大きくなってすれ違いという利点を有する。

【0013】さらに、請求項2に記載しているように、

雌係合片部の水平係合突片部の上方に、該水平係合突片部よりも突出長の短い上記木質床材主体の上端部よりなる上側突片部を設けてこれらの上下突片部間に水平嵌合溝を形成していると共に雌係合片部の水平係合突片部の先端上部を断面し字状に切欠いて上記上側突片部が嵌合可能な形状を有する嵌合段部と上記水平嵌合溝が挿嵌可能な形状を有する水平突条部とを形成しておく、隣接する床材が水平突条部と嵌合溝との嵌合によって上下方向の動きが拘束されと共に、水平突条部が嵌合溝の底面側の可撓性基材によって弾性的に押し上げられ、両者の嵌合が正確に行われて精度のよい床施工が可能となるものである。

【0014】請求項3に記載しているように、上記雌係合片部において、雌係合片部は水平係合突片部の上面に嵌合溝部を設けて断面上向きし字状に形成していると共に、雌係合片部はその水平係合突片部の下面に前記嵌合溝部に嵌合可能な位置に係合突条部を残して断面向下向きし字状に形成しておく、雌雄実が形成された一方の側面間で上下方向の動きを拘束し、他方の端面に形成された雌雄係合片部で床材同士が離反するのを防ぐと共に、雌雄係合片部は上下方向の嵌め合せだけで良いので施工し易い。

#### 【0015】

【実施例】本発明の実施例を図面について説明すると、

1は一定幅と長さを有する長方形形状の木質床材主体で、3〜7mmの厚み、又はバネ鋼板、又はアルミ板、MDP等の比重が0.5〜0.9の木質板の単体又は複合体からなり、その下面に同一形状の適度の弾性を有する可撓性基材2を一体に貼着して床材Fを形成している。なお、木質化板1の大きさは特に限定されないが、一例を挙げると、短辺方向の長さが50〜300mm、長辺方向の長さが600〜1800mm、厚みが3〜9mmの長方形板に形成されている。

【0016】一方、可撓性基材2の種類は特に限定されない。一方、可撓性基材2の比重を上記木質床材主体1よりも大きい1.0以上、好ましくは木質床材主体1の比重の1.5倍以上の高比重基材に形成することにより、上記木質床材主体1の曲げヤング係数がばらついても可撓性基材2の自重で雌雄実により弾性を付与できるように構成している。

【0017】さらに、この可撓性基材2の厚みを3〜10mmに設定すると共にこの厚みと上記比重との積を、上記

方に、該水平係合突片部よりも突出長の短い上記木質床材主体の上端部よりなる上側突片部を設けてこれらの上下突片部間に水平嵌合溝を形成していると共に雌係合片部の水平係合突片部の先端上部を断面し字状に切欠いて上記上側突片部が嵌合可能な形状を有する嵌合段部と上記水平嵌合溝が挿嵌可能な形状を有する水平突条部とを形成してなることを特徴とするものである。

【0008】更に、請求項3に記載した発明は、上記雌雄係合片部において、雌係合片部は水平係合突片部の上面に嵌合溝部を設けて断面上向きし字状に形成していると共に、雌係合片部はその水平係合突片部の下面に前記嵌合溝部に嵌合可能な位置に係合突条部を残して断面向下向きし字状に形成してなることを特徴とするものである。

#### 【0009】

【作用】木質床材主体の下面に適度な弾性を有する可撓性基材を一体に貼着しているため、この床材を床下地面上に敷設した時に、可撓性基材が床下地面の形状に応じて変形し、床下地面の不陸を吸収すると共に床下地面からの浮き上がり現象がなくなつて床鳴りを生じさせることなく良好な歩行が可能となる。

【0010】さらに、互いに平行な前後端面と両側端面とのいずれかに、一端部の下半部を上面に嵌合溝部を設けた水平係合突片部からなる雌係合片部に形成し、他端部の上半部を下面に嵌合突条部を突設してなる水平係合突片部からなる雄係合片部に形成しているため、一方の床材の嵌合溝部を有する水平係合突片部上に他方の床材の水平係合突片部を重ね合わせるようにして接続させる際に、少なくともその下半部が可撓性基材によって形成されている雌係合片部の水平係合突片部が雄係合片部の水平係合突片部の押し付けによって圧縮変形して両者の係合が円滑に行われ、施工性が向上するものであり、その上、下側の水平係合突片部の嵌合溝部に上側の水平係合突片部の嵌合突条部が嵌合して床材同士が互いに離間する方向に移動するのを規制され、床材の端面間に目隠が生じる虞はない。

【0011】また、嵌合溝部の底面には可撓性基材が露出していても共にこの嵌合溝部に嵌合する突条部の少ない下端面も可撓性基材によって形成されているため、両者の変形により床材間の段差や隙間を吸収すると共に歩行時における接触音も防止できる。このような嵌合溝部や突条部を有する水平係合突片部は、切削加工によって形成し得るので、別体の係合金具を取り付ける必要はなく、生産性が向上する。

【0012】なお、水平係合突片部側と直角に隣接する両端面に設けた雌雄実において、雌雄の下半部を上記可撓性基材により形成する一方、雄実の下面に可撓性基材の上端部からなる弾性層を設けておくことによって、これらの雌雄実の変形により段差や隙間を吸収し、且つ歩行時における接触音の防止が可能となるばかりで

木質床材主体1の厚みと比重との積よりも大にして、重心が可撓性基材2内に位置させた床材Fを構成しているものである。なお、木質床材主体1と可撓性基材2との接着剤としては、ポリウレタン、ビニルウレタン、酢酸ビニル、エチレン酢ビ、アクリル樹脂などのように、硬化後においても柔軟性を有する接着剤が使用される。

【0018】また、上記木質床材主体1の下面には、鋸等の切削具によって長さ方向に10~100mm 間隔毎に幅方向に貫通する切溝3が刻設されている。切溝3の深さは、木質床材主体1の下面(可撓性基材2との接着面)から上面に向かって該木質床材主体1の厚みの1/3以上となるように切削され、曲げ剛性は残存する2/3の厚さの3乗、即ち、 $8/27$ 以下に低減され、これらの切溝3、3...によって木質床材主体1に可撓性を付与していると共に軽量化を図っている。なお、上記切溝3の深さを余り深くすると、その切溝3から木質床材主体1が折損する虞れが生じるので、木質床材主体1の厚みの $3/4$ 以下にしておくことが好ましい。

【0019】この床材Fの互いに平行な辺を形成している前後端面と両側端面において、互いに平行な長辺側の前後端面には図2に示すように、雌雄実4、5が夫々形成されている一方、互いに平行な短辺側の両側端面には図3に示すように、雌雄係合部6、7が夫々形成されている。なお、前後端面に雌雄係合部6、7を、両側端面に雌雄実4、5を形成しておいてもよい。

【0020】上記雌雄実4、5及び雌雄係合部6、7の構造を具体的に説明すると、雌実部4は図2に示すように、床材Fの前端面における中央の一定厚さ部分を前端面から内方に向かって一定深さ、全長に亘って刻設することにより形成された前方に向かって開口している溝4aからなり、この溝4aの奥底から前方に向かって突出している上下水平突条部4b、4cにおいて、上側の突条部4bは木質床材主体1の一部によって形成されてその前端部を所定幅、切除することにより該突条部4bの突出長を短く形成していると共に下側の突条部4cは可撓性基材2の一部によって形成されており、溝4aの奥底面の下端部には可撓性材料が露出した構造を有している。

【0021】雄実部5は床材Fの木質床材主体1の後端部を全長に亘って断面L字状に切欠くことにより上記雌実4の上側突条部4bと同一断面形状を有する段部5aを形成すると共に可撓性基材2の後端部を全長に亘って断面逆L字状に切欠くことにより上記雌実4の下側突条部4cと同一断面形状を有する嵌合空間部5bに形成してあり、これらの段部5aと嵌合空間部5b間、即ち床材Fの後端面中央部に雌実4の上記溝4aに嵌合可能な形状を有する突条部5cに形成している。この突条部5cの下面の幅は上面側の幅よりも広く形成されていると共に該下面に係合空間部5bの切欠き時に残存させた可撓性基材2の上端部からなる弾性層5dを設けている。

【0022】雌係合部6は図3に示すように、床材F

の一侧端上半部を全幅に亘って断面L字状に切欠くと共に中央部を長さ方向に適宜深さ全幅に亘って穿設することにより、下側には可撓性基材2の端部からなる水平係合突片部6aを、上側には該突片部6aよりも突出長の短い木質床材主体1の一侧端部よりなる突片部6bを形成すると共に、中央部には水平方向に開口した水平嵌合溝6cを設けている。さらに、上側突片部6bで被覆されない部位における下側の水平係合突片部6aの上面中央部にその端面と平行に全幅に亘って上向きに開口した適宜深さの係合溝部6dを刻設している。

【0023】雄係合部7は床材Fの他側端下半部を、可撓性基材2の一部を残すようにして断面逆L字状に切欠くことにより、上記一侧端下半部に突設している下側水平係合突片部6aが嵌合可能な断面形状を有する下向き段部7aと、該段部7aの側端面から突出した木質床材主体1の他端部よりなる水平係合突片部7bとを形成すると共に、この水平係止突片部7bの下面中央部に上記切欠時に残存させた可撓性基材2の一部で一侧端部側の上記下側水平係合突片部6aに設けている係合溝部6dと同一断面形状を有し且つ該係合溝部6dが嵌合可能な位置に係合突条部7cを形成している。さらに、水平係合突片部7bの先端上部を断面L字状に切欠いて上記一侧端部側の上側突片部6bが嵌合可能な形状を有する嵌合段部7dと水平嵌合溝6cに挿嵌可能な形状を有する水平突条部7eとを形成している。

【0024】このように構成した床材Fを床下地材上に施工するには、床材F、F同士は短辺側の端部に形成している雌雄係合部6、7を図5に示すように順次連結することによって長さ方向に敷設され、前後端面側の雌雄実4、5を図4に示すように順次連結することによって幅方向に敷設されるものである。

【0025】この施工時において、対向する床材F、Fの雌雄係合部6、7同士を連結させる際に、雌係合部6の下側係合突片部6aは適度な弾性を有する可撓性基材2より形成されているので、先に敷設された床材Fの該雌係合部6に次に敷設する床材Fをその雄係合部7側を斜め下方に向けた状態で突き当てると、該雄係合部7の水平係合突片部7bの先端が下側係合突片部6aの上面に当接して該突片部6aを弾性的に圧縮させ、この状態から床材Fを徐々に水平方向に伏動させながら押し進めることによって雄係合部7の水平突条部7eが雌係合部6の水平嵌合溝6c内に円滑に挿嵌してゆくと共に係合溝部6dに係合突条部7cが嵌まり込んで床材F、F同士が水平突条部7eと嵌合溝6cとの係合によって上下方向の妄動を拘束されると共に下側係合突片部6aの弾力によって水平突条部7eの上面が嵌合溝6aの上側内面に押付けられ、床材F、Fが段差を生じさせることなく面に施工し得るものである。

【0026】さらに、上向き開口の係合溝部6dに下向き係合突条部7cが嵌合しているため、床材F、F同士が離

間する方向に変動するのを拘束され、目隙の発生も防止されると共に雌係合体部6の可撓性基材2からなる係合突片部6aと雄係合体部7の係合突片部7bとの摩擦力が大きいために床材Fがずれ難くなるものである。

【0027】又、対向する床材F、Fの雌雄実4、5の嵌合においても、雌実4の下側水平突条部4cが可撓性基材2の端部によって形成されているので、雄実5の嵌め込みが円滑に行われると共に下側水平突条部4cの弾力によって雄実5の突条部5cの上面が雌実4の溝4aの上側内面に圧接し、床材F、Fの上面が面一状態に保持すると共に雄実5の突条部5cの下面に可撓性基材2の残部からなる弾性層5dを設けているため、雌雄実4、5同士の摩擦力が一層増大して前後、左右方向のずれを強く拘束し得るものである。

【0028】このように、床材Fを釘や接着剤を用いることなく床下地材上に順次敷設して床を構成するものであるが、木質床材主体1に反りや振れが生じていても、上記のように可撓性基材2の比重と厚みとの積が木質床材主体1のそれよりも大きくしていると共に該木質床材主体1にその下面から上方に向かって適宜深さの多数の切溝3を設けているので、木質床材主体1の剛性に可撓性基材2の自重が打ち勝って木質床材主体1が可撓性基材2の馴染み変形に追従することになる。すなわち、床材全体が外力により強制的に床下地面に沿うように形状補正を行うことなく、床板自体が床下地面に応じた形状の自己補正機能を備えている。

【0028】従って、この床材Fを床下地上に敷設した時に、床材全体が床下地面の形状に応じて馴染み変形し、床下地面の不陸を吸収すると共に床下地面からの浮き上がり現象がなくなって床鳴りを生じさせることなく良好な歩行が可能となり、また、床材同士の端面が正確に接合して精度のよい施工が可能になるものである。

【0030】以上の実施例で示した床材Fにおいては、雌雄係合体部6、7における水平係合突片部6aと係合突条部7cとを全体的に可撓性基材2によって形成しているが、図6に示すように、水平係合突片部6aの上層部を木質床材主体1の一部によって形成すると共に係合突条部7cの下部を可撓性基材2の一部によって形成するように可撓性基材2としてや、薄肉のものをを用いてもよく、また、図7に示すように可撓性基材2として木質床材主体1よりも肉厚のものをを用いて雄係合体部7の水平係合突片部7bの下層部を可撓性基材2によって形成しておいてもよい。要するに、雌雄係合体部6、7において、係合溝部6dの少なくとも溝底部と係合突条部7cの先端部(下端部)とが可撓性基材2の一部によって形成しておけば、本発明を満足させることができる。

【0031】また、雌雄係合体部6、7の形状としては、図8に示す請求項3のように、上記雌雄係合体部において、雌係合体部6は水平係合突片部61の上面に係合溝部62を設けて断面上向きL字状に形成しているとともに

に、雄係合体部7はその水平係合突片部71の下面に前記係合溝部62に嵌合可能な位置に係合突条部72を残して断面上向きL字状に形成しており、その他の構造は上記実施例と同様である。なお、床材Fは平面長方形形状のものを示したが、正方形であってもよい。

【0032】

【発明の効果】以上のように本発明の建築用床材によれば、木質床材主体の下面に適度な弾性を有する可撓性基材を一体に貼着しているため、この床材を床下地上に敷設した時に、可撓性基材が床下地面の形状に応じて馴染み変形し、床下地面の不陸を吸収すると共に床下地面からの浮き上がり現象がなくなって床鳴りを生じさせることなく良好な歩行が可能となるものである。

【0033】さらに、床材の互いに平行な前後端面と両側端面とのいずれかに、一端部の下半部を上面に係合溝部を設けた水平係合突片部からなる雌係合体部に形成し、他端部の上半部を下面に係合突条部を突設してなる水平係合突片部からなる雄係合体部に形成すると共に上記雌係合体部における少なくとも係合溝部の底部から下層部分を可撓性基材により形成しているため、一方の床材の係合溝部を有する水平係合突片部に他方の床材の水平係合突片部を重ね合わせるようにして接続させる際に、雌係合体部の水平係合突片部を敷設すべき他方の床材の水平係合突片部の押し付けによって圧縮変形させることができるから、両者の係合が円滑に行われて施工性が向上するものであり、その上、下側の水平係合突片部の係合溝部に上側の水平係合突片部の係合突条部が嵌合して床材同士が互いに離間する方向に移動するのを確実に阻止することができ、床材の端面間に目隙が生じるのをなくし得るものである。

【0034】また、係合溝部の底面には可撓性基材が露出していると共にこの係合溝部に嵌合する突条部の少なくとも下端部も可撓性基材によって形成されているため、両者の馴染み変形によって床材間の段差や隙間を吸収すると共に歩行時における接触音も防止でき、しかも、両者の摩擦力が大きくて溝方向にずれるのを阻止することができ、精度のよい施工が可能となるものである。その上、このような係合溝部や突条部を有する水平係合突片部は、切削加工によって形成し得るので、別体の係合金具を取り付ける必要はなく、生産性が向上する。

【0035】また、水平係合突片部側と直角に隣接する両端面に設けた雌雄実において、雌実の下半部を上記可撓性基材により形成する一方、雄実の下面に可撓性基材の上端部からなる弾性層を設けているため、これらの雌雄実の馴染み変形により段差や隙間の発生をなくし得ると共に歩行時における接触音の発生を防止できるものであり、その上、両者の摩擦抵抗が大きくなってずれ難いという利点を有する。

【0036】さらに、請求項2に記載している発明によ

れば、雌係合体部の水平係合突片部の上方に、該水平係合突片部よりも突出長の短い上記木質床材主体の上端部よりなる上側突片部を設けてこれらの上下突片部間に水平嵌合溝を形成していると共に雄係合体部の水平係合突片部の先端上部を断面し字状に切欠いて上記上側突片部が嵌合可能な形状を有する嵌合段部と上記水平嵌合溝が挿嵌可能な形状を有する水平突条部とを形成しているので、隣接する床材が水平突条部と嵌合溝との嵌合によって上下方向の動きを拘束されると共に、水平突条部が嵌合溝の底面側の可撓性基材によって弾性的に押し上げられ、両者の係合が正確に行われて精度のよい床施工が可能となるものである。

【0037】加えて、請求項3に記載している発明によれば、上記雌雄係合体部において、雌係合体部は水平係合突片部の上面に係合溝部を設けて断面上向きし字状に形成していると共に、雄係合体部はその水平係合突片部の下面に前記係合溝部に嵌合可能な位置に係合突条部を残して断面向下し字状に形成しておくこと、雌雄実が形成された一方の側端面で上下方向の動きを拘束し、他方の端面に形成された雌雄係合体部で床材同士が離反するのを防ぐと共に、雌雄係合体部は上下方向の嵌め合せだけで良いので施工し易い。

【図面の簡単な説明】

【図1】本発明床材の平面図、

【図2】そのY-Y線拡大断面図、

【図3】そのX-X線拡大断面図、

【図4】雌雄実同士の係合状態を示す一部断面図、

【図5】雌雄係合体部同士の係合状態を示す一部断面図、

【図6】本発明の別な実施例を示す断面図、

【図7】本発明の更に別な実施例を示す断面図、

【図8】雌雄係合体部の別な形態を示す断面図、

【図9】従来例を示す平面図、

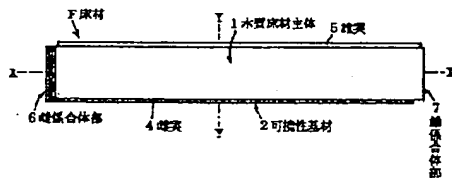
【図10】そのY'-Y'線拡大断面図、

【図11】そのX'-X'線拡大断面図、

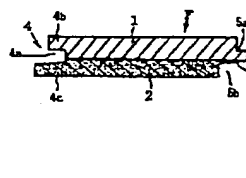
【符号の説明】

- 1 木質床材主体
- 2 可撓性基材
- 4、5 雌雄実
- 6 雌係合体部
- 6a 水平係合突片部
- 6d 係合溝部
- 7 雄係合体部
- 7b 水平係合突片部
- 7c 係合突条部

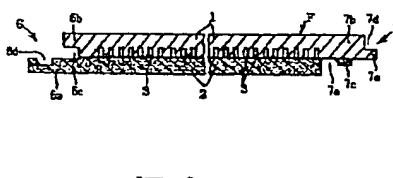
【図1】



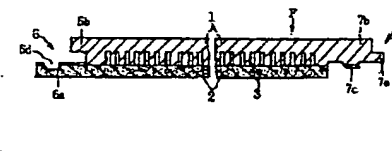
【図2】



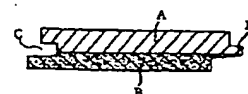
【図3】



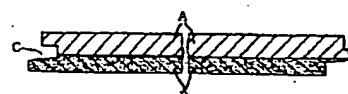
【図6】



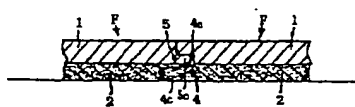
【図10】



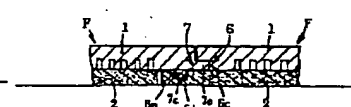
【図11】



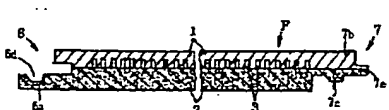
【図4】



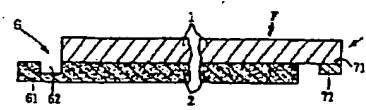
【図5】



【図7】

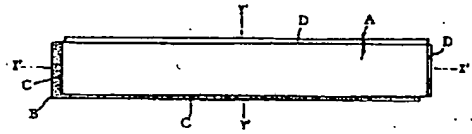


【図8】





【図9】



---

フロントページの続き

(72)発明者 竹原 章宏  
大阪市北区中之島2-3-18 大建工業株  
式会社内



**English translation of  
the Japanese patent application  
nr. 7-310426**

Japanese Unexamined Patent Publication No. 7-310426

Publication Date: November 28, 1995

Application No.: 6-129655

Application Date: May 18, 1994

Inventors: Konishi et al

Applicant: Daiken Kogyo Co., Ltd.

Title of the Invention: Floor Material for Construction

[Abstract]

[Object] To provide directly-laid floor material capable of high-precision installation without gaps occurring between floor material pieces.

[Configuration]

Floor material F is formed by main wood-quality floor material pieces being integrally adhered onto a flexible base material 2 having an appropriate degree of elasticity, wherein one of the front and rear edge planes and both side edge planes comprises a groove 4 having a horizontal protrusion portion 4c with the lower half portion thereof being formed of the edge portion of the above flexible base material 2, and the other edge surface comprises a tongue 5 having an elastic layer 5d formed of the edge portion of the above flexible base material 2 on the lower surface thereof, and wherein a portion made up of a part of the flexible base material 2 of the tongue-and-groove 4 and 5 mutually coming

into contact deforms in a conforming manner while increasing friction resistance so as to prevent occurrence of shifting and gaps, and further comprising a male-female engaging portion 6 and 7 at both mutually parallel side edge planes, with an upward-opening engaging groove portion 6d provided on the female engaging portion 6 and a downward-facing engaging protrusion portion 7c provided on the male engaging portion 7 being formed of a portion of the flexible base material 2 so as to improve ease of installation by the confirming deformation of both, and preventing occurrence of gaps by the engaging of the groove 6d and protrusion 7c.

[Claims]

1. Floor material for construction comprising floorboards formed by a flexible base material having an appropriate degree of elasticity being integrally adhered to the lower surface of main wood-quality floor material pieces shaped such that the front and rear edge planes and both side edge planes are each mutually formed as parallel edge planes, wherein one of said front and rear edge planes and both side edge planes have a tongue-and-groove with a groove and a tongue formed thereto, and the other has a male-female engaging portion comprising: a female engaging portion with a horizontal engaging protrusion formed at the lower half portion of one edge portion side by cutting away the upper half portion thereof in an L-shaped cross-sectional form,

with an engaging groove portion parallel with the tip plane of said protrusion provided thereto, wherein said flexible base material is exposed at the base plane of this engaging groove portion at least; and a male engaging portion with an upper horizontal engaging protrusion formed at the upper half portion of the other edge portion side by cutting away the lower half portion thereof so as to be capable of engaging said horizontal engaging protrusion at the one side, with formation capable of engaging said engaging groove portion being provided to the lower plane of said horizontal engaging protrusion, wherein the lower end side is formed of a portion of said flexible base material.

2. Floor material for construction according to Claim 1, wherein, regarding said male-female engaging portion, an upper side protrusion portion formed of the upper edge portion of said main wood-quality floor material piece is provided above the horizontal engaging protrusion portion of said female engaging portion at a protrusion length that is shorter than that of said horizontal engaging protrusion portion, with a horizontal fitting groove formed between these upper and lower protrusion portions, while the tip upper portion of the horizontal engaging protrusion portion of said male engaging portion is notched in an L-shaped cross-sectional form so as to form a fitting stepped portion having a shape capable of fitting with said upper side

protrusion portion and a horizontal protrusion portion having a form to which said horizontal fitting groove can be inserted and fit.

3. Floor material for construction according to Claim 1, wherein, regarding said male-female engaging portion, said female engaging portion is provided with an engaging groove portion on the upper plane of the horizontal engaging protrusion portion so as to form a upwards-facing L-shaped cross-sectional form, and said male engaging portion retains an engaging protrusion portion capable with fitting with said engaging groove on the lower plane of the horizontal engaging protrusion portion thereof so as to form a downwards-facing L-shaped cross-sectional form.

[Detailed Description of the Invention]

[0001]

[Industrial Field of the Invention]      The present invention relates to floor material for construction, suitable for installing by directly placing upon sub-floors formed of plywood or particle board, reinforced concrete sub-floors, OA floors, and other such flat sub-floors, without using adhesive agents.

[0002]

[Description of the Related Art]      Conventionally, methods are widely employed for installing floor material on a sub-floor that involve using uneven fiber or sheet cushioning

material applied to the lower surface of rectangular plain wood boards or plywood flooring material to improve absorbing, adhesion, and soundproofing, wherein these floorboards are applied to the sub-floor using an adhesive agent, but not only does the task of applying the adhesive agent and so forth complicate the job, there is also the problem in that fixing the floor material integrally to the sub-floor makes the task of replacing the floor material difficult.

[0003]

Accordingly, the present Applicant has developed a directly-lain floor material as described in Japanese Patent Application No. 5-152604. This floor material is arranged such that, as shown in Fig. 9 through Fig. 11, a flexible base material B is integrally applied to the lower surface of wood-quality main floor material A, the flexible base material B having an appropriate elasticity wherein the product of the relative density and thickness thereof is greater than that of the wood-quality main floor material A, wherein a groove portion C is provided to one end portion where a long and short edge are adjacent at right angles, and a tongue portion D is provided to the other end portion, with the center of gravity of the floor material located within the flexible base material B so that the entire floorboard deforms to meet the form of the sub-floor, thus

absorbing unevenness in the sub-floor surface and preventing floorboards from floating up off of the sub-floor, and from creaking.

[0004]

[Problems to be Solved by the Invention]

However, with such a structure, there has been a problem in that, with the floor material installed on the sub-floor surface, the tongue-and-groove portions C and D of neighboring floor material pieces are only fit by being abutted, so in the event that slippage occurs between the floor material pieces due to walking, earthquakes, etc., or in the event that the floor material pieces themselves expand or shrink due to absorption or release of humidity and so forth, the tongue-and-groove portions move in directions so as to be distanced one from another and gaps appear at the position that the tongue-and-groove portions are abutted, meaning that a floor with good precision could not be obtained.

[0005]

Occurrence of such gaps can be prevented by attaching restricting members such as hooks or the like capable of mutually retaining the opposing edge portions of the floor material pieces, but with such an arrangements there are problems in that fitting of the restricting members one to another may not go smoothly at the time of installation,



there may be unevenness between the upper surfaces of the engaged restricting members, the restricting members make noise by coming into contact with one another, and further, the task of attaching restricting members to the main floor material pieces is troublesome to the extent of not being suitable for mass production. It is an object of the present invention to provide a floor material for construction that is capable of thoroughly solving such problems.

[0006]

[Means for Solving the Problems] In order to achieve the above object, the floor material for construction according to the present invention comprises floorboards formed by a flexible base material having an appropriate degree of elasticity being integrally adhered to the lower surface of main wood-quality floor material pieces shaped such that the front and rear edge planes and both side edge planes are each mutually formed as parallel edge planes, wherein one of the front and rear edge planes and both side edge planes have a tongue-and-groove with a groove and a tongue formed thereto, and the other has a male-female engaging portion comprising: a female engaging portion with a horizontal engaging protrusion formed at the lower half portion of one edge portion side by cutting away the upper half portion thereof in an L-shaped cross-sectional form, with an

engaging groove portion parallel with the tip plane of the protrusion provided thereto, wherein the flexible base material is exposed at the base plane of this engaging groove portion at least; and a male engaging portion with an upper horizontal engaging protrusion formed at the upper half portion of the other edge portion side by cutting away the lower half portion thereof so as to be capable of engaging the horizontal engaging protrusion at the one side, with formation capable of engaging the engaging groove portion being provided to the lower plane of the horizontal engaging protrusion, wherein the lower end side is formed of a portion of the flexible base material.

[0007]

Also, with the floor material for construction described in Claim 2, regarding the male-female engaging portion, an upper side protrusion portion formed of the upper edge portion of the main wood-quality floor material piece is provided above the horizontal engaging protrusion portion of the female engaging portion at a protrusion length that is shorter than that of the horizontal engaging protrusion portion, with a horizontal fitting groove formed between these upper and lower protrusion portions, while the tip upper portion of the horizontal engaging protrusion portion of the male engaging portion is notched in an L-shaped cross-sectional form so as to form a fitting stepped

portion having a shape capable of fitting with the upper side protrusion portion and a horizontal protrusion portion having a form to which the horizontal fitting groove can be inserted and fit.

[0008]

Further, with the floor material for construction described in Claim 3, regarding the male-female engaging portion, the female engaging portion is provided with an engaging groove portion on the upper plane of the horizontal engaging protrusion portion so as to form a upwards-facing L-shaped cross-sectional form, and the male engaging portion retains an engaging protrusion portion capable with fitting with the engaging groove on the lower plane of the horizontal engaging protrusion portion thereof so as to form a downwards-facing L-shaped cross-sectional form.

[0009]

[Operation]

Flexible base material having an appropriate degree of elasticity is integrally applied to the lower surface of the main wood-quality floor material pieces, so that when installed on a sub-floor, the entire floorboard deforms to meet the form of the sub-floor, thus absorbing unevenness in the sub-floor surface and preventing floorboards from floating up off of the sub-floor and from creaking, resulting in a situation suitable for walking.

[0010]

Further, at one or the other of the mutually parallel front and rear edge planes and side edge planes, a female engaging portion is formed of a horizontal engaging protrusion portion provided with an engaging groove on the upper surface of the lower portion of one end portion, and a male engaging portion is formed of a horizontal engaging protrusion portion provided with an engaging protrusion erected on the lower surface of the upper portion of the other end portion, so at the time of connecting the two by placing the horizontal engaging protrusion portion of one floor material piece on top of the horizontal engaging protrusion portion of another floor material piece, the horizontal engaging protrusion portion of the female engaging portion with at least the lower half thereof formed of the flexible base material is compressed and deformed by the pressing of the horizontal engaging protrusion portion of the male engaging portion, so both are engaged smoothly, thereby improving ease of installation, and further, the engaging protrusion portion of the horizontal engaging protrusion portion at the upper side fits with the engaging groove portion of the horizontal engaging protrusion portion at the lower side, thereby restricting movement in directions of being distanced one from another, so gaps do not appear between the edges of the floor material.

[0011]

Also, the flexible base material is exposed at the base plane of the engaging groove portion, and at least the lower end portion of the protrusion fitting to this engaging groove portion also is formed of the flexible base material, so offsets or gaps between the floor material pieces can be absorbed by the deformation of both, and contact noise at the time of walking can also be prevented. The horizontal engaging protrusion portions having such engaging grooves or protrusion can be formed by cutting or grinding, and there is no need to attach separate engaging metal pieces, so productivity increases.

[0012]

Further, regarding the tongue-and-groove provided at both edge planes coming into contact with the horizontal engaging protrusion portion side at right angles, the lower half portion of the groove is formed of the flexible base material, while an elastic layer formed of the upper edge portion of the flexible base material is provided at the lower plane of the tongue, thereby allowing the deformation of the tongue-and-groove to absorb offsets or gaps between the floor material pieces and contact noise at the time of walking can be prevented, and further, the friction resistance between the two increases so there is the advantage that slippage does not occur easily.

[0013]

Further, as described in Claim 2, with an arrangement wherein an upper side protrusion portion formed of the upper edge portion of the main wood-quality floor material piece is provided above the horizontal engaging protrusion portion of the female engaging portion at a protrusion length that is shorter than that of the horizontal engaging protrusion portion, with a horizontal fitting groove formed between these upper and lower protrusion portions, while the tip upper portion of the horizontal engaging protrusion portion of the male engaging portion is notched in an L-shaped cross-sectional form so as to form a fitting stepped portion having a shape capable of fitting with the upper side protrusion portion and a horizontal protrusion portion having a form to which the horizontal fitting groove can be inserted and fit, vertical movement is restricted by the neighboring floorboard fitting with the horizontal protrusion portion and fitting groove, and further, the horizontal protrusion portion is elastically pressed upwards by the flexible base material on the bottom surface side of the fitting groove, so the engagement of both is carried out in a sure manner, thus enabling precise floor installation.

[0014]

As described in Claim 3, regarding the male-female engaging portion, with an arrangement wherein the female

engaging portion is provided with an engaging groove portion on the upper plane of the horizontal engaging protrusion portion so as to form a upwards-facing L-shaped cross-sectional form, and the male engaging portion retains an engaging protrusion portion capable with fitting with the engaging groove on the lower plane of the horizontal engaging protrusion portion thereof so as to form a downwards-facing L-shaped cross-sectional form, vertical movement is restricted at one side edge plane where the tongue-and-groove is formed, and separation of the floor material pieces one from another is prevented by the tongue-and-groove engaging portion formed at the other edge plane, and also the tongue-and-groove engaging portion only requires vertical fitting, and thus can be easily installed.

[0015]

[Embodiments]

Describing an embodiment of the present invention with reference to the drawings, reference numeral 1 denotes a main wood-quality floor material piece of a rectangular shape having a certain width and length, formed singularly of 3 to 7 ply plywood, particle board, MDF, or other like wood-quality boards having relative density of 0.5 to 0.9, or of a combination thereof, with a flexible base material 2 having the same shape and an appropriate degree of elasticity applied to the lower surface thereof, thus

forming floor material P. Incidentally, while the size of the main wood-quality floor material piece is not particularly restricted, to give an example, the length in the short direction is 50 to 300 mm, the length in the long direction is 600 to 1800 mm, and the thickness is 3 to 9 mm, thus forming a rectangular plate.

[0016]

On the other hand, while the type of the flexible base material 2 is not particularly restricted, vinyl chloride resin, urethane resin, chloroplene, butyl, and other such synthetic rubber resins, polyester resin, or various types of recycled plastics, and the like can be used, and further, heavy powder such as calcium carbonate, silica, alumina, carbon black, metal powder, metal oxide powder or the like is appropriately mixed into these resins, so that the flexible base material 2 has a relative density of 1.0 or greater and greater than the main wood-quality floor material 1, and preferably formed as a high-relative-density base material with a relative density 1.5 times or more than that of the main wood-quality floor material piece 1, so that even in the event that the bending Young's coefficients of the main wood-quality floor material piece 1 are irregular, the flexible base material 2 itself can provide bending elasticity with its own weight in a sure manner.

[0017]



Further, the thickness of this flexible base material 2 is set at 3 to 10 mm, and the product of this thickness and the above relative density is made so as to be greater than the product of the thickness and the relative density of the main wood-quality floor material piece 1, thereby forming the floor material F by situating the center of gravity within the flexible base material 2. Incidentally, regarding the adhesive agent used between the main wood-quality floor material piece 1 and the flexible base material 2, adhesive agents which retain flexibility even after hardening, such as polyurethane, vinyl urethane, vinyl acetate, ethylene vinyl acetate, acrylic resin, and so forth. [0018]

Also, cut grooves 3 traversing the width direction have been cut in the lower surface of the main wood-quality floor material piece 1 by a saw or like cutting instrument every 10 to 100 mm. The depth of the cut grooves 3 is made to be  $1/3$  or less of the thickness of the main wood-quality floor material piece 1 from the lower surface of the main wood-quality floor material piece 1 (the surface of adhesion with the flexible base material 2) upwards, the bending rigidity is reduced to the remaining  $2/3$  to the third power, i.e., to  $8/27$  or less, so these grooves 3, 3... provide the main wood-quality floor material piece 1 with flexibility and also reduces weight. Incidentally, cutting the cut grooves

3 too deep may result in the main wood-quality floor material piece 1 breaking at the cut grooves 3, so the depth is preferably  $3/4$  or less of the thickness of the main wood-quality floor material piece 1.

[0019]

At the front and rear edge planes and both side edge planes each forming mutually parallel sides of the floor material F, tongue-and-grooves 4 and 5 are formed at the front and rear edge planes of the mutually parallel long sides as shown in Fig. 2, while the male-female engaging portions 6 and 7 are each formed at both side edge planes of the mutually parallel short sides as shown in Fig. 3.

Incidentally, the male-female engaging portions 6 and 7 may be formed at the front and rear edge planes, and the tongue-and-grooves 4 and 5 at both side edge planes.

[0020]

Describing the construction of the above tongue-and-grooves 4 and 5 and male-female engaging portions 6 and 7 more specifically, the groove portion 4 is made up of a groove 4a which has been formed by engraving a portion of a certain thickness at the center of the front edge plane of the floor material F to a certain depth from the front edge plane side inwards over the entire length thereof, thus opening toward the front direction, and at the upper and lower protrusion portions 4b and 4c protruding forwards from

the depth-wise bottom of this groove 4a, the upper protrusion portion 4b is formed of a portion of the main wood-quality floor material piece 1 and the front edge portion is cut away by a predetermined width so as to shorten the protrusion length of formation of the protrusion portion 4b, and the protrusion portion 4c is formed of a portion of the flexible base material 2, having a structure wherein the flexible material is exposed at the lower portion of the bottom plane of the groove 4a.

[0021]

The tongue portion 5 is formed by forming a step portion 5a having the same cross-sectional form as the upper protrusion portion 4b of the above groove 4 by notching the rear edge of the main wood-quality floor material piece 1 of the floor material F in an L-shape over the entire length thereof, and by forming a fitting space portion 5b having the same cross-sectional form as the lower protrusion portion 4c of the above groove 4 by notching the rear edge of the flexible base material 2 in a reverse-L-shape over the entire length thereof, thereby forming a protrusion portion 5c having a form capable of fitting into the groove 4a of the groove 4, between the step 5a and the fitting space portion 5b, i.e., at the center portion of the rear edge plane of the floor material F. The width of the lower surface of this protrusion portion 5c is formed wider than

the side of the upper surface side, and an elastic layer 5d formed of the upper edge portion of the flexible base material 2 reserved at the time of notching the engaging space portion 5b is formed on the lower surface.

[0022]

As shown in Fig. 3, regarding the female engaging portion 6, the upper half portion of one side of the floor material F is notched in an L-shaped cross-sectional form over the entire width thereof and the center portion is bored to an appropriate depth in the length direction over the entire width thereof, thereby forming a horizontal engaging protrusion portion 6a formed of the edge portion of the flexible base material 2 on the lower side, a protrusion portion 6b having a shorter protrusion length than the horizontal engaging protrusion portion 6a formed of the main wood-quality floor material piece 1 on the upper side thereof, and a horizontal fitting groove 6c opened in the horizontal direction at the center portion thereof. Further, an engaging groove portion 6d is engraved to an appropriate depth so as to open facing upwards on the center portion of the upper surface of the lower horizontal engaging protrusion portion 6a at the part which is not covered by the upper protrusion portion 6b, in a manner parallel to the edge plane thereof, over the entire width.

[0023]

Regarding the male engaging portion 7, the other lower half portion of the floor material F is notched in a reverse-L-shaped cross-sectional form so as to leave a portion of the flexible base material 2, thereby forming a downward-facing step portion 7a having a cross-sectional form to which the lower side horizontal engaging protrusion portion 6a is capable of fitting to, and a horizontal engaging protrusion portion 7b formed of the other edge portion of the main wood-quality floor material piece 1 protruding from the side edge plane of the step portion 7a, and forming out of a part of the flexible base material 2 left remaining at the time of the above notching at the center portion of the lower surface of this horizontal engaging protrusion portion 7b, an engaging protrusion portion 7c having the same cross-sectional form as the engaging groove portion 6d provided to the lower horizontal engaging protrusion portion 6a on the one side edge portion, at a position so as to be capable of fitting with the engaging groove 6d. Further, the tip upper portion of the horizontal engaging protrusion portion 7b is notched in an L-shaped cross-sectional form so as to form a fitting step portion 7d having a form capable of fitting with the upper protrusion 6b at the above one side edge portion, and a horizontal protrusion 7e having a form capable of insertion to and fitting with the horizontal fitting groove portion 6c.

[0024]

In order to install the floor material F thus configured on the sub-floor, the floor material pieces F and F are laid in the length direction by sequentially linking the male-female engaging portions 6 and 7 formed on the edge portion of the short side as shown in Fig. 5, and are laid in the side direction by sequentially linking the tongue-and-groove 4 and 5 at the front and rear edge planes as shown in Fig. 4.

[0025]

At the time of this installing, when linking the male-female engaging portions 6 and 7 of opposing floor material pieces F and F, the lower horizontal engaging protrusion portion 6a of the female engaging portion 6 is formed of flexible base material 2 having an appropriate degree of elasticity, so abutting the floor material F to be laid next against the female engaging portion 6 of the floor material F laid before, with the male engaging portion 7 facing downwards, the tip of the horizontal engaging protrusion portion 7b of the male engaging portion 7 comes into contact with the upper surface of the lower horizontal engaging protrusion portion 6a and compresses the engaging protrusion portion 6a in an elastic manner, and pushing the floor material F forwards while gradually laying it down in the horizontal direction causes the horizontal protrusion 7e of

the male engaging portion 7 to be smoothly inserted and fit into the horizontal fitting groove portion 6c of the female engaging portion 6 and also the engaging protrusion portion 7c to fit into the engaging groove 6d, so that the floor material pieces F and F are restricted regarding vertical movement by the engaging of the horizontal protrusion 7e and the fitting groove portion 6c, and the upper plane of the horizontal protrusion 7e is pressed against the upper inner surface of the engaging groove portion 6a by the elastic force of the lower horizontal engaging protrusion portion 6a, whereby the floor material pieces F and F can be laid as a single plane without offset.

[0026]

Further, the engaging protrusion portion 7c fits into the engaging groove 6d opening upwards, so that the floor material pieces F and F are restricted regarding movement in the separating directions, and occurrence of gaps can be prevented, and further, the friction between the engaging protrusion portion 6a of the female engaging portion 6 formed of the flexible base material 2 and the engaging protrusion portion 7b of the male engaging portion 7 is great, so the floor material F does not shift easily.

[0027]

Also, regarding the fitting of the tongue-and-groove 4 and 5 of the floor material pieces F and F, the lower

horizontal protrusion portion 4c of the groove 4 is formed of the edge of the flexible base material 2, so fitting of the tongue 5 is performed smoothly and the upper surface of the protrusion 5c of the tongue 5 is pressed against the upper inner surface of the groove 4a of the groove 4 due to the elastic force of the lower horizontal protrusion portion 4c such that the upper face of the floor material pieces F and F are held in a flat state, and an elastic layer 5d formed from the remaining part of the flexible base material 2 is provided to the bottom surface of the protrusion portion 5c of the tongue 5 so the friction between the tongue-and-groove 4 and 5 increases even more, powerfully restricting shifting in the forward/backward and right/left directions.

[0028]

Thus, the floor material F is sequentially laid on a sub-floor without using nails or adhesive agent, so as to configure a floor, and even in the event that there is bowing or warping of the main wood-quality floor material 1, the product of the relative density and the thickness of the flexible base material 2 is made to be greater than that of the main wood-quality floor material 1 and a great number of cut grooves of an appropriate depth are provided from the lower surface of the main wood-quality floor material 1 in the upwards direction, so the weight of the flexible base



material 2 overcomes the rigidity of the main wood-quality floor material 1 and the main wood-quality floor material 1 follows the deformation of the flexible base material 2. That is, the floorboards themselves have the function of self-correcting to a form following the sub-floor surface, without any forced form correction by external force to cause the entire floorboards to follow the sub-floor surface.

[0028]

Accordingly, at the time of laying the floor material F on the sub-floor, the entire floor material deforms according to the form of the sub-floor surface, thereby absorbing unevenness in the sub-floor surface, and doing away with floating off of the sub-floor surface and with creaking so as to be suitable for walking, and further, the edge planes of the floor material pieces are joined in a sure manner, enabling precise installation.

[0030]

With the floor material F shown in the above embodiment, the horizontal engaging protrusion portion 6a and the engaging protrusion portion 7c of the male-female engaging portions 6 and 7 are formed of the flexible base material 2, but an arrangement may be made such as shown in Fig. 6 wherein the upper layer portion of the horizontal engaging protrusion portion 6a is formed as a part of the main wood-quality floor material 1 and the lower portion of the

engaging protrusion portion 7c is formed of the flexible base material 2 such that the flexible base material 2 is somewhat thinner, or as in Fig. 7 wherein a flexible base material 2 thicker than the main wood-quality floor material 1 is used so as to form the lower layer portion of the horizontal engaging protrusion portion 7b of the male engaging portion 7 of a portion of the flexible base material 2. To summarize, forming at least the groove bottom portion of the engaging groove 6d and the tip portion of the engaging protrusion portion 7c (the lower edge portion) of the male-female engaging portions 6 and 7 from the flexible base material 2 satisfies the present invention.

[0031]

Also, regarding the form of the male-female engaging portions 6 and 7, as with Claim 3 shown in Fig. 8, at the male-female engaging portions, the female engaging portion 6 is provided with an engaging groove portion 62 on the upper surface of the horizontal engaging protrusion portion 61 and is formed in an upwards-facing L-shaped cross-sectional form, and the male engaging portion 7 leaves an engaging protrusion portion 72 capable of fitting with the engaging groove portion 62 on the lower surface of the horizontal engaging protrusion portion 71 and is formed in an downwards-facing L-shaped cross-sectional form, with other constructions being the same as with the above embodiment.

Also, the floor material F has been shown as a flat rectangular shape, but may be a square instead.

[0032]

[Advantages] According to the floor material for construction according to the present invention as described above, a flexible base material having an appropriate degree of elasticity is integrally adhered to the lower surface of main wood-quality floor material, so at the time of laying the floor material on the sub-floor, the flexible base material deforms according to the form of the sub-floor surface, thereby absorbing unevenness in the sub-floor surface, and doing away with floating off of the sub-floor surface and with creaking so as to be suitable for walking.

[0033]

Further, at one or the other of the mutually parallel front and rear edge planes and side edge planes, a female engaging portion is formed of a horizontal engaging protrusion portion provided with an engaging groove on the upper surface of the lower portion of one end portion, and a male engaging portion is formed of a horizontal engaging protrusion portion provided with an engaging protrusion erected on the lower surface of the upper portion of the other end portion, so at the time of connecting the two by placing the horizontal engaging protrusion portion of one floor material piece on top of the horizontal engaging

protrusion portion of another floor material piece, the horizontal engaging protrusion portion of the female engaging portion is compressed and deformed by the pressing of the horizontal engaging protrusion portion of the other piece of floor material to be laid, so both are engaged smoothly, thereby improving installation, and further, the engaging protrusion portion of the horizontal engaging protrusion portion at the upper side fits with the engaging groove portion of the horizontal engaging protrusion portion at the lower side, thereby restricting movement of the floor material pieces in directions of being distanced one from another, so gaps between the edges of the floor material can be done away with..

[0034]

Also, the flexible base material is exposed at the base plane of the engaging groove portion, and at least the lower end portion of the protrusion fitting to this engaging groove portion also is formed of the flexible base material, so offsets or gaps between the floor material pieces can be absorbed by the deformation of both, contact noise at the time of walking can also be prevented, and the friction of both is great enough to prevent shifting in the groove direction, so installation can be made with good precision. Moreover, the horizontal engaging protrusion portions having such engaging grooves or protrusions can be formed by

cutting or grinding, so there is no need to attach separate engaging metal pieces, and productivity increases.

[0035]

Also, regarding the tongue-and-groove provided at both edge planes coming into contact with the horizontal engaging protrusion portion side at right angles, the lower half portion of the groove is formed of the flexible base material, while an elastic layer formed of the upper edge portion of the flexible base material is provided at the lower plane of the tongue, thereby allowing the deformation of the tongue-and-groove to do away with offsets or gaps between the floor material pieces and contact noise at the time of walking can be prevented, and further, the friction resistance between the two increases so there is the advantage that slippage does not occur easily.

[0036]

Further, according to the invention described in Claim 2, an upper side protrusion portion formed of the upper edge portion of the main wood-quality floor material piece is provided above the horizontal engaging protrusion portion of the female engaging portion at a protrusion length that is shorter than that of the horizontal engaging protrusion portion, with a horizontal fitting groove formed between these upper and lower protrusion portions, while the tip upper portion of the horizontal engaging protrusion portion

of the male engaging portion is notched in an L-shaped cross-sectional form so as to form a fitting stepped portion having a shape capable of fitting with the upper side protrusion portion and a horizontal protrusion portion having a form to which the horizontal fitting groove can be inserted and fit, so vertical movement is restricted by the neighboring floorboard fitting with the horizontal protrusion portion and fitting groove, and further, the horizontal protrusion portion is elastically pressed upwards by the flexible base material on the bottom surface side of the fitting groove, so the engagement of both is carried out in a sure manner, thus enabling precise floor installation.

[0037]

In addition, according to the invention described in Claim 3, regarding the above male-female engaging portion, the female engaging portion is provided with an engaging groove portion on the upper plane of the horizontal engaging protrusion portion so as to form a upwards-facing L-shaped cross-sectional form, and the male engaging portion retains an engaging protrusion portion capable with fitting with the engaging groove on the lower plane of the horizontal engaging protrusion portion thereof so as to form a downwards-facing L-shaped cross-sectional form, so vertical movement is restricted at one side edge plane where the tongue-and-groove is formed, and separation of the floor

material pieces one from another is prevented by the tongue-and-groove engaging portion formed at the other edge plane, and also the tongue-and-groove engaging portion only requires vertical fitting, and thus installation is easy.

[Brief Description of the Drawings]

[Fig. 1] Fig. 1 is a plan view of the floor material according to the present invention.

[Fig. 2] Fig. 2 is an enlarged cross-sectional view along line Y-Y therein.

[Fig. 3] Fig. 3 is an enlarged cross-sectional view along line X-X therein.

[Fig. 4] Fig. 4 is a partial cross-sectional diagram illustrating the engaged state of the tongue-and-groove.

[Fig. 5] Fig. 5 is a partial cross-sectional diagram illustrating the engaged state of the male-female engaging portion.

[Fig. 6] Fig. 6 is a cross-sectional view illustrating another embodiment of the present invention.

[Fig. 7] Fig. 7 is a cross-sectional view illustrating yet another embodiment of the present invention.

[Fig. 8] Fig. 8 is a cross-sectional view illustrating another embodiment of the male-female engaging portion.

[Fig. 9] Fig. 9 is a plan view illustrating a conventional example.

[Fig. 10] Fig. 10 is an enlarged cross-sectional view along

line Y'-Y' therein.

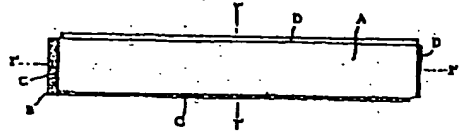
[Fig. 11] Fig. 11 is an enlarged cross-sectional view along line X'-X' therein.

[Reference Numerals]

- 1 Main wood-quality floor material
- 2 Flexible base material
- 4, 5 Tongue-and-groove
- 6 Female engaging portion
- 6a Horizontal engaging protrusion portion
- 6d Engaging groove portion
- 7 Male engaging portion
- 7b Horizontal engaging protrusion portion
- 7c Engaging protrusion portion



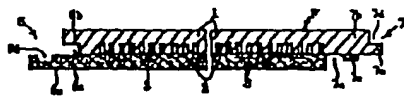
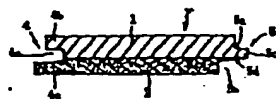
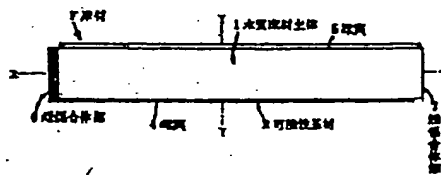
【図9】



【図1】

【図2】

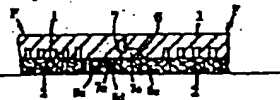
【図3】



【図6】

【図4】

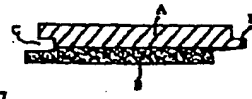
【図5】



【図10】

【図7】

【図8】



【図11】

